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U.S. Agricultural Research Service
U. S. DEPARTMENT OF AGRICULTURE

U. S. Department of Agriculture
Agricultural Research Service

Dr. B. T. Shaw
Administrator

Dr. G. W. Irving, Jr.
Deputy Administrator
for Utilization Research and Development

EASTERN UTILIZATION
RESEARCH AND DEVELOPMENT
DIVISION

Dr. P. A. Wells
Director

In 1938, Congress authorized the construction of four regional research laboratories around the country for the conduct of basic and applied research to find new and wider uses for American farm commodities. From the Eastern Laboratory has evolved a complex of 10 laboratories now known as the Eastern Utilization Research and Development Division. Seven of them are located in the Wyndmoor, Pa., headquarters, which is often referred to by its original name, the Eastern Regional Research Laboratory. The remaining 3 are located in the South Building, U. S. Department of Agriculture, Washington, D. C., and at the Agricultural Research Center, Beltsville, Md.

The Eastern Division conducts research on *animal products*: dairy, meat, rats, and leather; *plant products*: Eastern fruits and vegetables, tobacco, honey, maple, and new crops; and *allergens studies*.

For the locations and fields of research of the other 3 Utilization Research and Development Divisions, see page 19.

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September 1962 //

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OFFICE OF THE DIRECTOR

Director

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DR. R. E. LOTHROP

Assistant Director, Program Appraisal

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Assistant Director, Program Development

DR. W. I. PATTERSON*

Assistant Director, Industrial Development

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T. W. QUIGLEY, JR.*

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Marketing Research

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N. E. ROBERTS

ADMINISTRATIVE AND PLANT MANAGEMENT

Administrative Officer

E. A. CONNOR

Mechanical Superintendent

F. MACDONALD

*Washington, D. C.

LABORATORIES

ANIMAL FAT PRODUCTS LABORATORY

Chief: Dr. W. C. Ault

The Animal Fat Products Laboratory is divided into four investigations groups. Three of these are concerned with the development of specific products from animal fats in the fields of plastics, lubricants, and detergents; and the fourth is conducting exploratory research on the reactions of these fats and their fatty acids and other derivatives.

Plastics Investigations

Head: Dr. A. N. Wrigley

1. *Plasticizers from Animal Fat Derivatives.* Animal fat derivatives made by epoxidation, carboxylation, and hydroxylation are evaluated as plasticizers and for use in the internal and external modification of polymers. Long-chain phosphorus and sulfur compounds synthesized from animal fats are also evaluated as plasticizers.

2. *Isomerization.* Studies are carried out on the isomerization of double bonds of unsaturated fatty acids and derivatives from animal fats.

3. *Peroxides.* Peroxides are prepared from animal fats, and their properties, reactions, and applications are investigated.

4. *Polymerization of Animal Fats.* Monomers, polymers, and copolymers are prepared from animal fats. Polymerization mechanisms involved are studied, and the chemical reactions of the polymers are investigated.

5. *Structures of Polymers.* The relation of structure to the physical properties of long-chain compounds, polymers, and copolymers is studied.

Lubricants Investigations

Head: Vacancy

1. *Halogens.* Means of introducing halogens into fatty molecules are studied, and the mechanism of the reactions involved in stabilizing materials containing polymeric halogens is investigated.

2. *Alkylene Oxides.* Alkylene oxides are reacted with suitable fatty derivatives to make lubricant additives.

3. *New Lubricants.* New and useful products in the field of lubricants and lubricant additives are sought by applying novel, as well as known, reactions to animal fats, their component fatty acids, and their derivatives.

Detergents Investigations

Head: Dr. A. J. Stirton

1. *New Surface-Active Products.* Surface-active compounds made from suitable animal-fat derivatives are prepared and evaluated as detergents, wetting agents, emulsifiers, and similar products.

2. *Combination Detergents.* Detergents that are more efficient, or have a combination of useful properties, are sought by combining fat-derived compounds with soaps or other surface-active materials.

Exploratory Reactions Investigations

Head: Dr. D. Swern

1. *Activation Reactions.* Reactions are investigated which are designed to make use of the unactivated centers in saturated and unsaturated fatty acids and other derivatives from animal fats.

2. *Radiation-Induced Reactions.* Radiation-induced reactions are conducted on animal fats and derived fatty acids.

3. *Metalloid Derivatives.* Metalloid derivatives are prepared from animal fats and their component fatty acids.

ANIMAL FAT PROPERTIES LABORATORY

Chief: Dr. L. P. Witnauer

The Animal Fat Properties Laboratory investigates the chemical composition, molecular structure, and basic physical properties of animal fats and their derivatives, and evaluates potentially useful products made from them.

Chemical Composition and Structure Investigations

Head: R. W. Riemenschneider

1. *Analytical Methods.* New and improved methods are developed for quantitatively fractionating and determining the glycerides, fatty acids, cholesteryl esters, phospholipids, unsaponifiable constituents, and other components of animal fats.

2. *Glycerides in Shortenings.* Individual pure glycerides of known structure are synthesized or isolated from natural sources so that their composition can be related to their physical character and their performance in shortenings.

3. *Deterioration of Food and Feed Fats.* The effects of deteriorative changes in lipids are studied as they relate to the utilization of fats in food and feed.

4. *Oils from Uncultivated Plants.* The epoxy fatty acids of oils obtained from uncultivated plants, which can be modified for use in plastic compositions, are isolated and their properties determined, with a view to the possible development of these plants as industrially useful replacement crops for some now in surplus.

Physical Properties Investigations

Head: Dr. H. Susi

1. *Molecular Properties.* The molecular structure, reactions, and properties of compounds derived from animal fats are studied by spectrophotometry, X-ray diffraction, and electron microscopy.

2. *Development of Methods.* New and improved methods are devised for determining the composition and properties of animal fats and their derivatives based on absorption spectrophotometry, refractometry, X-ray, and other physical techniques.

3. *Application of New Techniques.* Such new techniques as nuclear magnetic resonance spectroscopy and mass spectrometry will be applied to investigate the composition, structure, and properties of animal fats and their derivatives.

Product Properties Evaluation Investigations

Head: Vacancy

1. *Evaluation of New Compositions.* Compositions based on animal fats that have potential use as plastics, elastomers, plasticizers, and coatings are evaluated through studies of their mechanical properties.

2. *New Techniques.* New techniques and apparatus are developed for evaluation of products derived from animal fats.

3. *Fundamental Properties.* The fundamental physical properties and molecular structure of animal fat derivatives are studied and the results are correlated with chemical constitution to establish a basis for developing such new and useful products as plastics, plasticizers, detergents, lubricants, and stabilizers.

DAIRY PRODUCTS LABORATORY

Chief: Dr. B. H. Webb (Washington, D. C).

The work of the Dairy Products Laboratory falls within four principal investigation areas. One is devoted to a study of milk concentrates and dried milks; the second to cheese and butterfat; the third to the complicated problem of retaining flavor in processed milks; and the fourth to a method for the removal of isotopes from milk.

Milk Concentrates Investigations

Head: Dr. M. J. Pallansch (Washington, D. C.)

1. *Chemistry of Milk Components.* The organic and physical chemistry of the proteins, lipids, and sugars of milk are studied.

2. *Fat Stabilization.* Means are sought to stabilize the butterfat in concentrated milks against oxidative changes.

3. *Dry Whole Milk.* The physico-chemical effects of the drying process on whole milk are studied with a view to the development of a dried whole milk.

4. *Evaporated Milks and Frozen Concentrates.* Improved evaporated and frozen concentrated milks are developed.

Cheese and Butterfat Investigations

Head: Dr. R. P. Tittsler (Washington, D. C.)

1. *Cheese Cultures.* Microbiological research is directed to the control of microbiological activity in cheese and other cultured dairy products.

2. *Cheesemaking Procedures.* More economical and efficient methods of making cheese are developed.

3. *Milk in Baked Goods.* A wider use of milk in baked goods is sought by the development of such products as high-milk protein bread, and improved milks for such use are developed.

4. *Butter and Cream Research.* Butter and butter oil are being worked on to improve their stability, new butterfat products are under development, and better processes for handling and preserving butter and cream are sought through basic studies of their physical properties.

5. *Whey Utilization.* The development of new and improved processes and products for the utilization of whey is being sought through a study of the chemical and biochemical characteristics of whey and its components.

Milk Flavor Investigations

Head: Vacancy (Washington, D. C.)

1. *Basic Studies on Milk Flavors.* The individual constituents of milk flavors are being isolated, purified, and identified, and the mechanism of flavor formation is being established.

2. *Flavor Stability.* Procedures are worked out to preserve desirable flavors and to prevent the formation of off-flavors.

3. *Off-Flavor Removal.* Processes are sought to remove the off-flavors that develop in both manufacturing and marketing milk.

4. *Taste Testing.* Statistically sound sensory tests are developed and correlated with objective tests so that flavor changes in milk and its products can be measured precisely.

Isotope Removal Investigations

Head: Dr. L. F. Edmondson (Beltsville, Md.)

1. *Methods of Isotope Removal.* Basic studies are made on the preferential removal of radioactive nuclides from milk.

2. *Development of a Process.* A practical plant process for removing radioactive nuclides from milk is sought.

3. *Effects of Isotope Removal.* The effect of this process on the composition, flavor, and nutritive value of milk is evaluated.

4. *Radioactivity Monitoring.* Practical plant methods are developed for the monitoring of radioactivity.

MILK PROPERTIES LABORATORY

Chief: Dr. G. C. Nutting

The Milk Properties Laboratory is concerned with basic studies of the composition of milk, the structure of its components, and interactions among them. Much of this work is directly related to the effects of processing on milk properties.

Biochemical Properties Investigations

Head: Dr. C. A. Zittle

1. *Milk Enzymes.* The basic chemistry of milk enzymes is studied and methods are developed for their purification and characterization.

2. *Protein Structure.* Purified proteins are split by specific proteolytic enzymes to peptide fragments, and these fragments are studied to determine their amino acid sequence and fine structure.

3. *Reactions of Milk Proteins and Salts.* The effect of heat on milk proteins in the presence of milk salts is determined.

4. *Interaction of Components.* The interaction between the various components of milk is evaluated.

5. *Basic Studies Related to Storage of Concentrated Milks.* Better resistance of concentrated milks to fat separation and gelation on storage is sought through the development of basic information.

Physical-Chemical Properties Investigations

Head: Dr. S. N. Timasheff

1. *Molecular-Kinetic Properties of Milk Proteins in Solution.* Such phenomena are studied as aggregation-dissociation, structural transformations, binding of small molecules and ions, and genetic differences.

2. *Inter-Molecular Forces.* The forces acting between protein and other molecules are investigated, as are the specificity of the forces and the nature of the processes that take place at particular interaction sites.

3. *Special Techniques.* Ultracentrifugal, electrophoretic, light-scattering, and radioactive-tracer techniques are applied in collaboration with other investigations groups within the Division.

4. *Macromolecular Studies.* Thermodynamics and statistical mechanics of macromolecules are studied.

MEAT LABORATORY

Chief: W. L. Sulzbacher (Beltsville, Md.)

The Meat Laboratory conducts research aimed at improving the quality of meat and meat products and at developing better methods of handling, preserving, and processing meats. These investigations are carried out in the areas of composition and quality, product stability, and microbiology.

Composition and Quality Investigations

Head: C. E. Swift (Beltsville, Md.)

1. *Meat Proteins.* The bio- and physico-chemical characteristics of meat proteins and their interactions with the nonprotein components of meat, such as fat and minerals, are studied.

2. *Composition and Structure Related to Quality.* The protein and other chemical components of meat are related to its structure and to qualities such as tenderness and juiciness, which may be dependent on structure.

3. *Improvement in Meats and Meat Products.* Basic knowledge of meat composition and structure is applied to improve methods of handling, processing, and storing meats to obtain products with more desirable qualities, including nutritive value, and to secure the optimum utilization of meats from all commercial grades and cuts.

Product Stability Investigations

Head: A. M. Gaddis (Beltsville, Md.)

1. *Processed and Freezer-Stored Meats.* Interrelationships between the biochemical and organoleptic changes involved in the processing and freezer-storage of meat and meat products are studied.

2. *Meat Flavor Components.* Normal and acquired meat flavor components are isolated and identified.

3. *Rancidity.* The chemical nature of rancidity is under study and means of retarding its development are being investigated.

4. *Enzymes and Meat Stability.* The role of native and other enzymes in the stability of meat and meat products is studied.

5. *Improved Processing Methods.* The knowledge obtained through this basic research is applied in the development of new and improved meat processing methods.

Microbiology Investigations

Head: Dr. J. A. Alford (Beltsville Md.)

1. *Microbial Flora.* The microbial flora of meat and meat products is studied. This includes work on both beneficial and undesirable microorganisms.

2. *Improved Preservation of Meat.* New and improved methods of preservation, involving such measures as pasteurization and irradiation or the use of antibiotics or other antimicrobial agents, are studied.

3. *Biochemical Effects of Microorganisms.* The fats and proteins of meat are studied to determine how they are affected biochemically by microorganisms growing at low temperatures and the knowledge obtained is applied in an effort to develop better products.

4. *Microorganisms and Meat Quality.* Relationships between flavor, keeping quality, and processing methods and the microorganisms associated with meat products are studied in order to develop new and improved products and processing methods.

HIDES AND LEATHER LABORATORY

Chief: Dr. J. Naghski

The Hides and Leather Laboratory does fundamental and applied research to develop better, more versatile, and more economical leathers. Its work is carried out in three areas of investigation, one dealing with the composition of hides and skins, the second with improvement of these materials by chemical modification, and the third with the various processes of hide preservation and leather manufacture.

Composition Investigations

Head: Dr. E. F. Mellon

1. *Properties of Hides and Skins.* A study is made of the composition, structure, and chemical and physical properties of animal hides and skins, their components and derivatives.

2. *Raw-Materials Composition and Finished-Materials Properties.* Relationships are established between the composition and structure of hides and skins and the properties of leathers, gelatins, and glues.

3. *Effects of Processing.* Selected processing operations are studied to determine their effects on the properties of hides and the products made from them.

4. *Analysis of Hide Components.* The proteins, mucoids, and lipoprotein complexes of hide are separated chemically and physically, and purified and identified.

5. *Test Methods and Instrumentation.* Physical and chemical methods and instrumentation are developed for determining composition, chemical structure, and physical properties of hide substances.

Chemical Modification Investigations

Head: Dr. E. M. Filachione

1. *Protein Complex in Hides.* Basic principles relating to the chemical modification of the protein complex as it occurs in animal hides or derived proteinaceous products are developed.

2. *Chemical Reactivity of Hides.* The interaction between animal hides and various organic reagents and chemicals is studied.

3. *Evaluation of New Hide Derivatives.* The fundamental physical and chemical properties of new derivatives are evaluated, and the scientific results are correlated for potential use in the discovery of new applications for animal hides and the creation of hide materials with unique properties.

4. *Improved Leathers.* A more profitable utilization of animal hides is sought through the development of new or improved types of leather and other products.

Processing Investigations

Head: Dr. W. Windus

1. *New Uses Through New Processes.* New and improved methods for curing, preserving, unhairing, and tanning of hides are sought through the acquisition and evaluation of basic processing information, leading to the production of leathers and other hide products with new and extended industrial uses.

2. *New Unhairing Methods.* Chemicals and enzymes are being applied experimentally in the development of more rapid and economical unhairing and treating processes.

3. *Mineral Tannages.* Leather with improved resistance to deterioration is sought through the study of mineral tannages.

4. *Combination Tannages.* Leather with improved or special properties is sought through the application of combination and modified tannages and post-tanning treatments.

5. *Test Methods.* Chemical and physical methods are developed for testing and evaluating the properties of domestic tanning materials and leathers tanned by these materials.

6. *Translation of Laboratory Results to Industrial Use.* Laboratory studies on the development of improved processes for hide conversion are correlated, so that counsel and advice can be provided to the Industry to permit the translation of laboratory discoveries to practical applications.

PLANT PRODUCTS LABORATORY

Chief: Dr. C. F. Woodward

The Plant Products Laboratory undertakes investigations on five specific plant products or groups of products, and also does analytical chemical research on these plants as well as on the composition of other agricultural commodities assigned to the Eastern Division. The five areas of investigation on plant products concern fruits, potatoes and other vegetables, honey, maple sirup, and tobacco.

Fruit Investigations

Head: Dr. C. H. Hills

1. *Study of Components.* This work is isolating and identifying the organic constituents of deciduous fruits. Of particular interest are those components that affect the color, flavor, aroma, and texture of raw and processed fruit products.

2. *Improvement in Processing.* Basic information on fruit constituents—their starch, organic acids, lipids, nitrogenous compounds, cell-wall material, pigments, and enzymes—is applied to obtain more efficient processing methods and higher-quality fruit products.

3. *Preprocessing Quality.* The influence of variety, cultural practices, and preprocessing treatments on the quality of processed fruit products is studied.

4. *New Products.* An extended use of Eastern deciduous fruits is sought through the development of new food and industrial products that can be made from them.

Potato and Other Vegetable Investigations

Acting Head: Dr. W. L. Porter

1. *Study of Components.* This work is isolating and identifying the constituents of potatoes and other vegetables. Of particular interest are those components that produce and control the color, flavor, and texture in fresh and processed products.

2. *Improvement in Processing.* Basic information on the constituents of potatoes and other vegetables—their starch, sugars, organic acids, lipids, nitrogenous compounds, cell-wall materials, pigments, and enzymes—is applied in this phase to obtain more efficient processing methods and higher-quality potato and other vegetable products.

3. *Preprocessing Quality.* The influence of varieties, cultural practices, and storing conditions on the quality of potato and other vegetable products is studied.

4. *New Products.* An extended use of Eastern potatoes and other vegetables is sought through the development of new food and industrial products that can be made from them.

Honey Investigations

Head: Dr. J. W. White, Jr.

1. *Composition.* The composition of all domestic floral types of honey is studied, and the carbohydrates, acids, nitrogenous compounds, and other components having possible biological activity are isolated, identified, and determined quantitatively.

2. *New and Improved Processes and Products.* Extended and improved uses for honey are sought through the development of new processes and products.

3. *New Analytical Techniques.* New methods of analysis applicable to honey utilization are developed.

4. *Beeswax.* The constituents of domestic beeswax related to quality are identified as an aid to improved refining of this apiary product.

Maple Investigations

Head: Dr. C. O. Willits

1. *Composition of Sap and Sirup.* The organic constituents of maple sap and of maple sugar and sirup are isolated, identified, and quantitatively determined.

2. *Flavor and Color Development.* The mechanism whereby maple sirup forms its flavor and color is determined.

3. *Microbiological Control.* Means are sought for controlling the microorganisms in sap which affect the flavor, color, and production of maple products.

4. *Sap Collection and Sirup Processing.* Collecting and processing techniques are studied in the light of their effect on the quality and uses of finished sirup.

5. *Industrial Products from Maple.* Improved and extended industrial uses of maple sirup are sought through the development of new processes and products.

Tobacco Investigations

Head: Dr. R. L. Stedman

1. *Determination of Compounds.* The alkaloidal, polyphenolic, and resinous components of tobacco, which contribute to leaf quality or might otherwise be of significance in the overall utilization of tobacco, are isolated and characterized. New procedures are developed for separating, characterizing, and quantitatively determining these compounds.

2. *Industrial Uses.* New or extended industrial uses for these compounds are developed.

3. *Smoke Constituents.* The chemical components of tobacco smoke are isolated and characterized, and the information is applied to the solution of problems in tobacco utilization.

4. *New Products.* New and improved tobacco products are developed by the application of information obtained through this research.

Special Plant Investigations

Head: Dr. C. L. Ogg

1. *Plant Screening.* Dioscorea plant species under agronomic study as a possible new crop are screened for steroidal sapogenins from which hormone drugs can be made.

2. *Determination of Spice Constituents.* Methods are developed for separating, characterizing, and quantitatively determining the constituents of spices important to their quality and use.

3. *Enzyme Inhibitors.* Pectinolytic and cellulolytic enzyme inhibitors from grape leaves and other plant materials are isolated and characterized.

4. *Test Methods and Instrumentation.* Physical and chemical methods and instrumentation are developed and improved for the conduct of these investigations.

5. *Microanalytical Studies.* Microanalytical work is conducted for all Laboratories of the Division.

ENGINEERING AND DEVELOPMENT LABORATORY

Chief: R. K. Eskew

The Engineering and Development Laboratory, which originates and evaluates in the pilot plant the engineering and cost aspects of new processes, is working in four investigation areas. Two of these consist of engineering studies on animal products and on plant products. The third is concerned with developing cost and design information, and the fourth with unit operations to obtain fundamental engineering data as a basis for the development of new processes and the improvement of existing ones.

Animal Products Engineering Investigations

Head: N. C. Aceto

1. *New and Improved Products.* New and improved products from animals are being originated, evaluated, and developed on a pilot-plant scale.

2. *Methods and Equipment.* The methods and equipment best suited to the requirements of the product are being determined, and new equipment is being devised where necessary.

3. *Pilot-Plant Operation.* Integrated pilot plants are planned and operated to obtain engineering data for estimation of commercial costs.

4. *Planning for Larger-Scale Processing.* Plans are developed for semi-works and larger-scale processing.

5. *Advice to Industry.* Industry is kept advised on commercialization of developments.

Plant Products Engineering Investigations

Head: J. Cording, Jr.

1. *New and Improved Products.* New and improved products from plants are being originated, evaluated, and developed on a pilot-plant scale.

2. *Methods and Equipment.* The methods and equipment best suited to the requirements of the product are being determined, and new equipment is being devised where necessary.

3. *Pilot-Plant Operation.* Integrated pilot plants are planned and operated to obtain engineering data for estimation of commercial costs.

4. *Planning for Larger-Scale Processing.* Plans are developed for semi-works and larger-scale processing.

5. *Advice to Industry.* Industry is kept advised on commercialization of developments.

Cost and Design Engineering Investigations

Head: Vacancy

1. *Preliminary Cost Estimates.* To help determine the advisability of operating a proposed process on a pilot-plant scale, preliminary cost estimates are prepared.

2. *Economic Feasibility of New Processes and Products.* Comprehensive engineering estimates of the cost to operate a new process or to make a new plant or animal product are obtained as a means of determining its economic feasibility.

3. *Pilot-Plant Design and Assembly.* Information on the design of commercial units for processes studied by the Laboratory is developed and made available to industry.

4. *Specifications.* Detailed engineering specifications are prepared for the purchase of complex pilot-plant equipment.

Unit Operations Engineering Investigations

Head: H. I. Sinnamon

1. *New Processes and Products.* A basis for the discovery or development of new processes and products from animal and plant commodities is provided by a fundamental study of unit operations.

2. *Equipment Design.* Fundamental data are obtained to permit the design of more efficient processing equipment.

3. *Relation to Practical Operation.* These fundamental findings are related to practical pilot-plant operation.

PIONEERING RESEARCH LABORATORIES

PIONEERING RESEARCH LABORATORY FOR ANIMAL PROTEINS

Chief Research Chemist: Dr. T. L. McMeekin

This Laboratory undertakes pioneering studies in the field of animal proteins. Its investigations encompass such considerations as the isolation, characterization, structure, properties, and reactions of animal proteins. New information is being developed in this Laboratory which is advancing the scientific knowledge of proteins and leading to new scientific principles and methods.

PIONEERING RESEARCH LABORATORY FOR ALLERGENS IN AGRICULTURAL PRODUCTS

Principal Research Biochemist:

Dr. H. Stevens (Washington, D. C.)

This Laboratory undertakes fundamental scientific investigations on the chemistry and immunology of allergens in agricultural products. These studies are concerned with the isolation and identification of the chemical and physiological properties of the allergens of food and industrial products derived from farm products, as well as with establishing the basic mechanisms whereby these materials produce the allergic response in man. The work of this Laboratory in the little-known field of immunochemistry is contributing to the general health of our people and is useful in pointing to methods of processing agricultural products so as to minimize their allergic effects.

OFFICE AND PHONE DIRECTORY

<u>Location</u>	<u>Name</u>	<u>Telephone</u>
Wyndmoor, Pa.		Chestnut Hill 7-5800
Room		Extension
3034	Aceto, N. C.	374
3006	Ault, W. C.	244
2026	Connor, E. A.	240
3024	Cording, J., Jr.	280
2015	Dryden, E. C.	230
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1004	Woodward, W. G. (Miss)	215
3101	Wrigley, A. N.	229
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South Bldg. Wash. 25, D. C.

Room		Dudley 8-
1644	Webb, B. H.	2365
0125	Stevens, H.	2351
1669	Quigley, T. W., Jr.	6169
1655	Patterson, W. I.	2361
0612	Pallansch, M. J.	2484
1639	Tittsler, R. P.	2465

Agr. Res. Center Beltsville, Md.

Granite 4-4800

Building No.		Extension
157	Edmondson, L. F.	582
200	Gaddis, A. M.	394
200	Sulzbacher, W. L.	394
200	Swift, C. E.	394
200	Alford, J. A.	394

OTHER UTILIZATION RESEARCH AND DEVELOPMENT DIVISIONS

NORTHERN

Address

1815 N. University St.
Peoria 5, Ill.

Director

Dr. F. R. Senti

Fields of Research

Cereal grains: corn, wheat, barley, grain sorghum, and oats; oilseeds: soybean, flaxseed, safflower, and erucic acid-containing oilseeds; new crops.

SOUTHERN

Address

1100 Robert E. Lee Blvd.
(Post Office Box 19687)
New Orleans 19, La.

Director

Dr. C. H. Fisher

Fields of Research

Cotton and cottonseed; tung fruit; pine gum; Southern fruits and vegetables, including citrus, sweetpotatoes, and cucumbers; sugarcane; rice; peanuts; new crops.

Address

800 Buchanan St.
Albany 10, Calif.

Director

Dr. M. J. Copley

Fields of Research

Western fruits, nuts, vegetables, and rice; poultry products; forage crops; wheat; barley; wool and mohair; sugar beets; dry beans and peas; castor beans; new crops.



Growth Through Agricultural Progress

